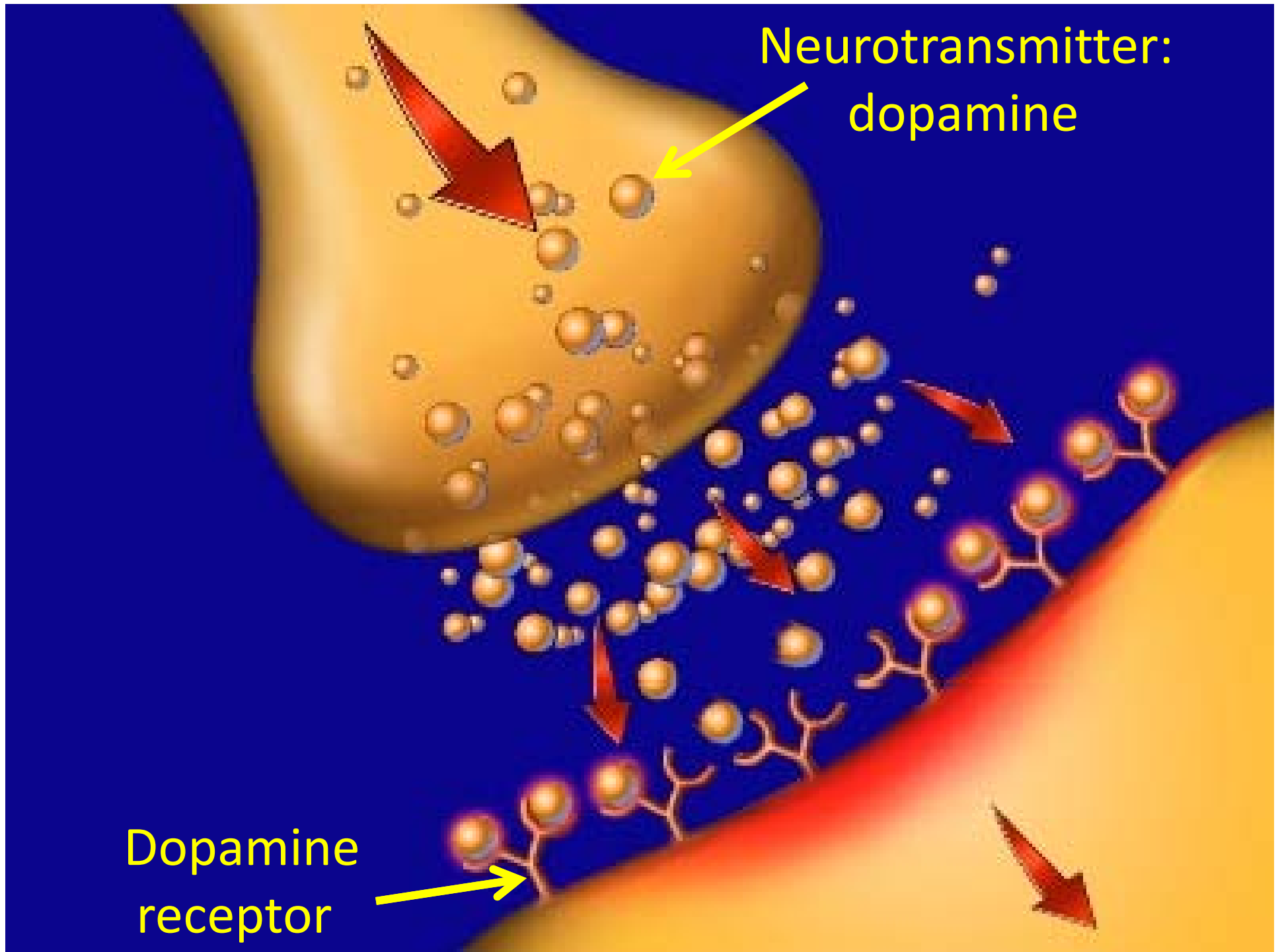


Personality

Neurotransmitter:
dopamine

Dopamine
receptor



Individual differences in DNA Repeats Polymorphism

Longer gene_ more repeats

```
1 aatttttgta tttttttag agacgggggtt tcaccatggt ggtcaggctg actatggagt
61 tattttaagg ttaatatata taaaggggtat gatagaacac ttgtcatagt ttagaacgaa
121 ctaacgatag atagatagat agatagatag atagatagat agatagatag atagacagat
181 tgatagtttt tttttatctc actaaatagt ctatagtaaa catttaatta ccaatattg
241 gtgcaattct gtcaatgagg ataaatgtgg aatcggtata attcttaaga atatatattc
301 cctctgagtt ttgataacct cagattttaa ggcc
```

Shorter gene_ less repeats

```
1 aatttttgta tttttttag agacgggggtt tcaccatggt ggtcaggctg actatggagt
61 tattttaagg ttaatatata taaaggggtat gatagaacac ttgtcatagt ttagaacgaa
121 ctaacgatag atagatagat agatagatag atagatagat agttttttt tatctcacta
181 aatagt ctatagtaaa catttaatta ccaatattg gtgcaattct gtcaatgagg
241 ataaatgtgg aatcggtata attcttaaga atatatattc cctctgagtt ttgat
301 acct cagattttaa ggcc
```

2-11 repeats in DRD4

Further study- 2 years later

Among heterosexual men, those with the longer D4DR genes are 6 times more likely to have slept with a woman than those with the short gene.

Long-gened people had more sexual partners than the short-gened people.

Further study: 2010

DRD4 gene : political ideology

Political ideology is thought to be a product of social environment and historical moment, but.....

DRD4 gene : political ideology

Friendships Moderate an Association between a Dopamine Gene Variant and Political Ideology

Jaime E. Settle University of California, San Diego

Christopher T. Dawes University of California, San Diego

Nicholas A. Christakis Harvard University

James H. Fowler University of California, San Diego

Scholars in many fields have long noted the importance of social context in the development of political ideology. Recent work suggests that political ideology also has a heritable component, but no specific gene variant or combination of variants associated with political ideology have so far been identified. Here, we hypothesize that individuals with a genetic predisposition toward seeking out new experiences will tend to be more liberal, but only if they are embedded in a social context that provides them with multiple points of view. Using data from the National Longitudinal Study of Adolescent Health, we test this hypothesis by investigating an association between self-reported political ideology and the 7R variant of the dopamine receptor D4 gene (DRD4), which has previously been associated with novelty seeking. **Among those with DRD4-7R, we find that the number of friendships a person has in adolescence is significantly associated with liberal political ideology.** Among those without the gene variant, there is no association. This is the first study to elaborate a specific gene-environment interaction that contributes to ideological self-identification, and it highlights the importance of incorporating both nature and nurture into the study of political preferences.

DRD4 gene : political ideology

Hypothesis:

Individuals with a genetic predisposition toward seeking out new experiences will tend to be more liberal, but only if they are embedded in a social context that provides them with multiple points of view.

DRD4 7R

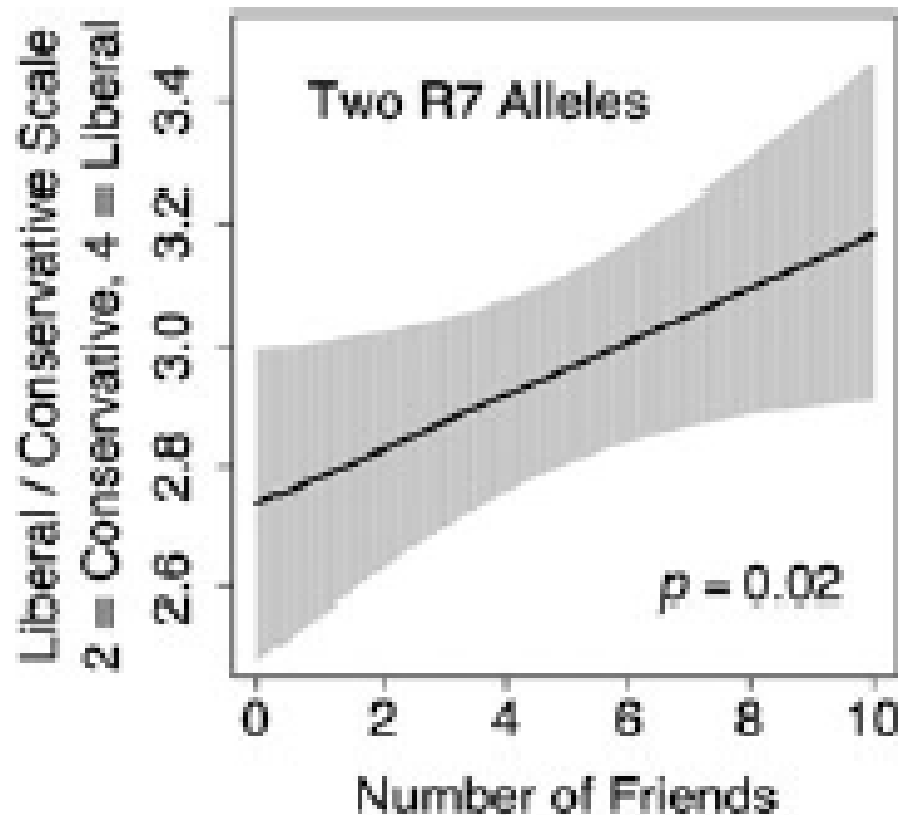
Personality

Openness

Ideology

Social context

DRD4-7R, Ideology, and friendship



Personality is not totally
determined by genes

Novelty seeking is 40% heritable

- And there are hundreds of genes associated with this novelty seeking behavior

* Environment still has an effect

Shy baby monkeys are fostered to confident mother monkey, they can outgrow their shyness even become the leader of a group.



Face your innate predisposition,
strive to improve it!

Do animals have personality?

Do animals have personality?
(how about invertebrates?)



Octopus's personality



1. **Active** vs. inactive

2. **Bold** vs. inhibited

3. **Anxious** vs. calm

Great tit's personality



Great tits



"Fast" birds

- Aggressive
- Approach novel objects
- Quickly approach members of the opposite sex



"Slow" birds

- Nonaggressive
- Avoid novel objects
- Slowly approach members of the opposite sex

***Drd4* gene polymorphisms are associated with personality variation in a passerine bird**

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¹Max-Planck Institute for Ornithology, PO Box 1564, 82319 Starnberg, Germany

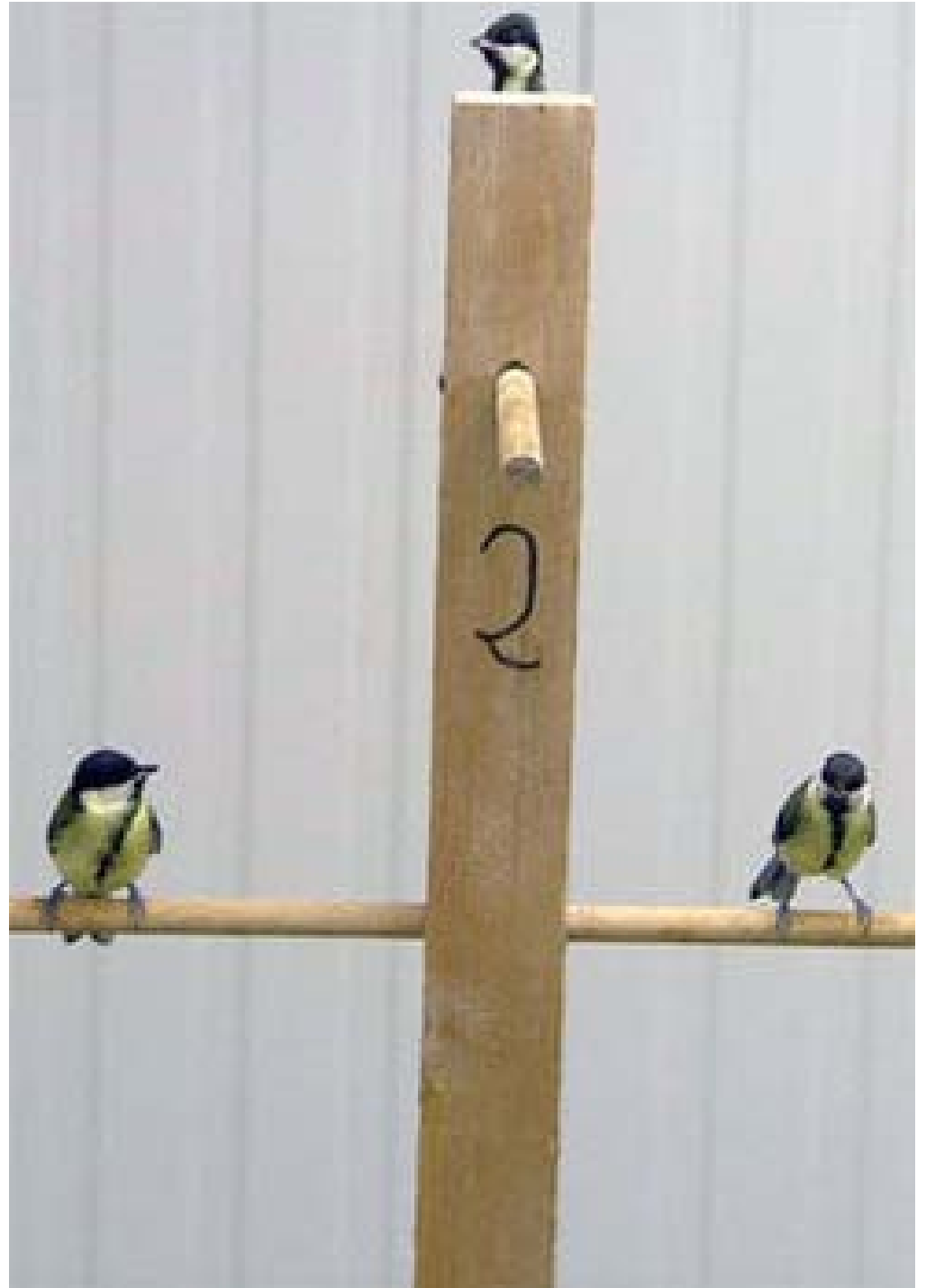
²Cawthron Institute, Private Bag 2, Nelson 7042, New Zealand

³Netherlands Institute of Ecology, PO Box 40, 6666 ZG Heteren, The Netherlands

Personality
Vs.
DRD4



Great tits

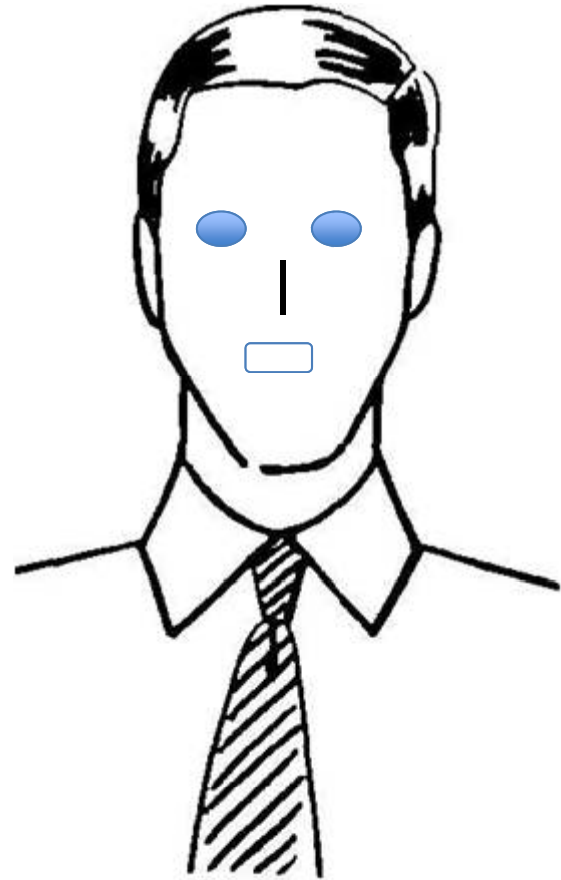


Personality and DRD4 variants

1. Songbirds
2. Chickens
3. Horses
4. Dogs
5. Humans

Personality might be related to morphological traits

Genes that are associated with a specific behavioral trait often times are also associated with other morphological or physiological traits.



Study of a European population

Shy people (study of a European population) are more likely to be **blue-eyed**, susceptible to allergies, tall and thin, narrow-faced, faster heartbeat.